Genetic Variability in *Acropora*

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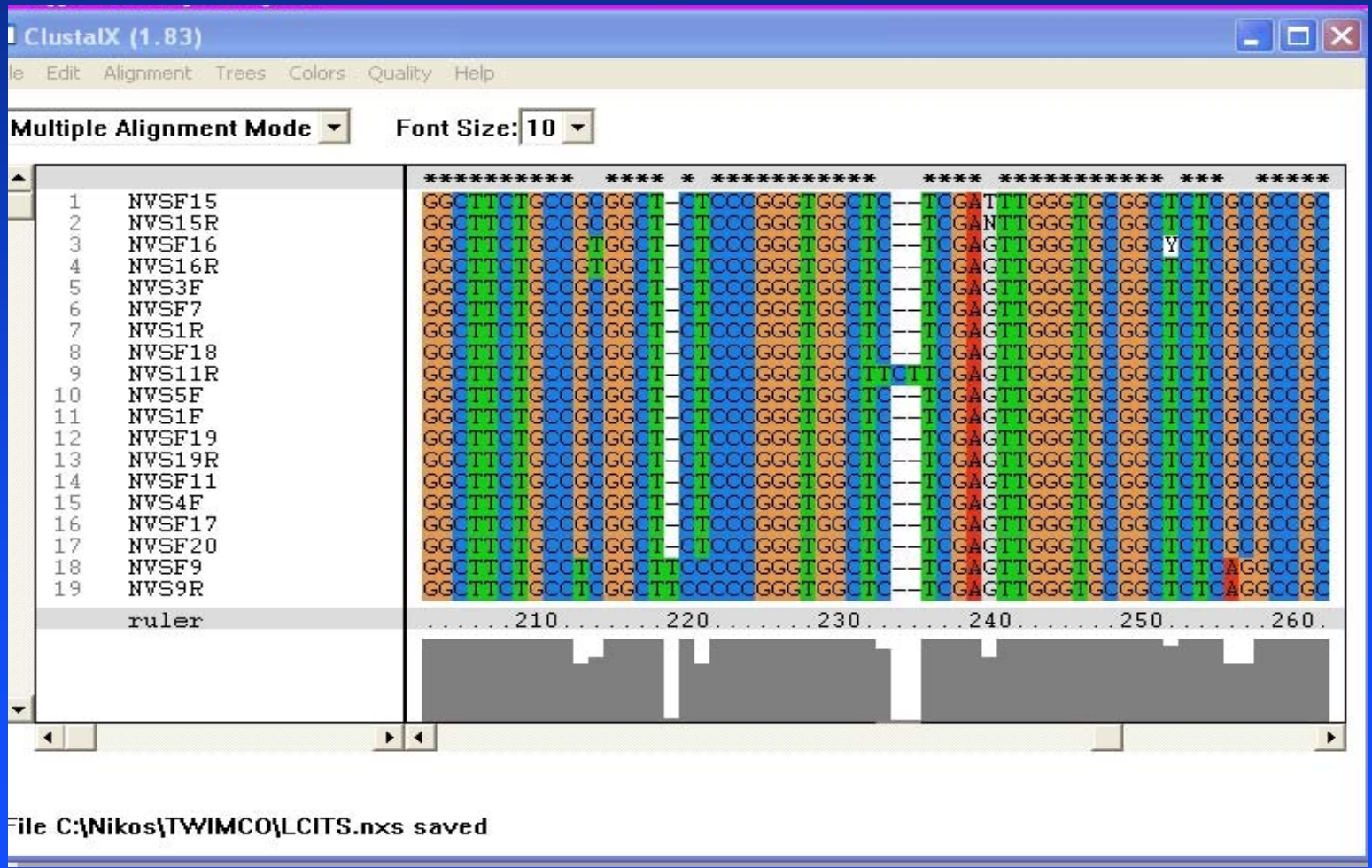
- Fact: genetic variation is the raw material of evolution

Visualizing DNA variation at the ITS-1 region



Observation

Primary mode of reproduction → colony fragmentation (low rates of sexual reproduction)

Prediction

Asexual reproduction will result in reduced (local) genetic diversity

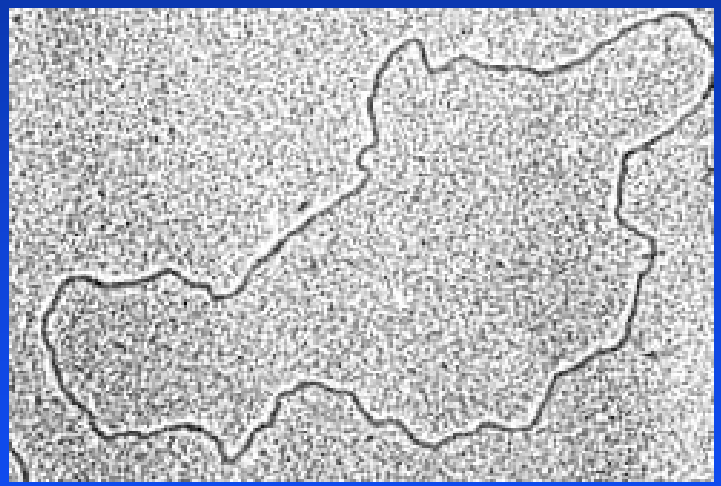
Acropora cervicornis

A. palmata

Goal of this proposal

- Evaluate the genetic variability of *A. cervicornis* and *A. palmata* at different levels of tissue organization

mtDNA



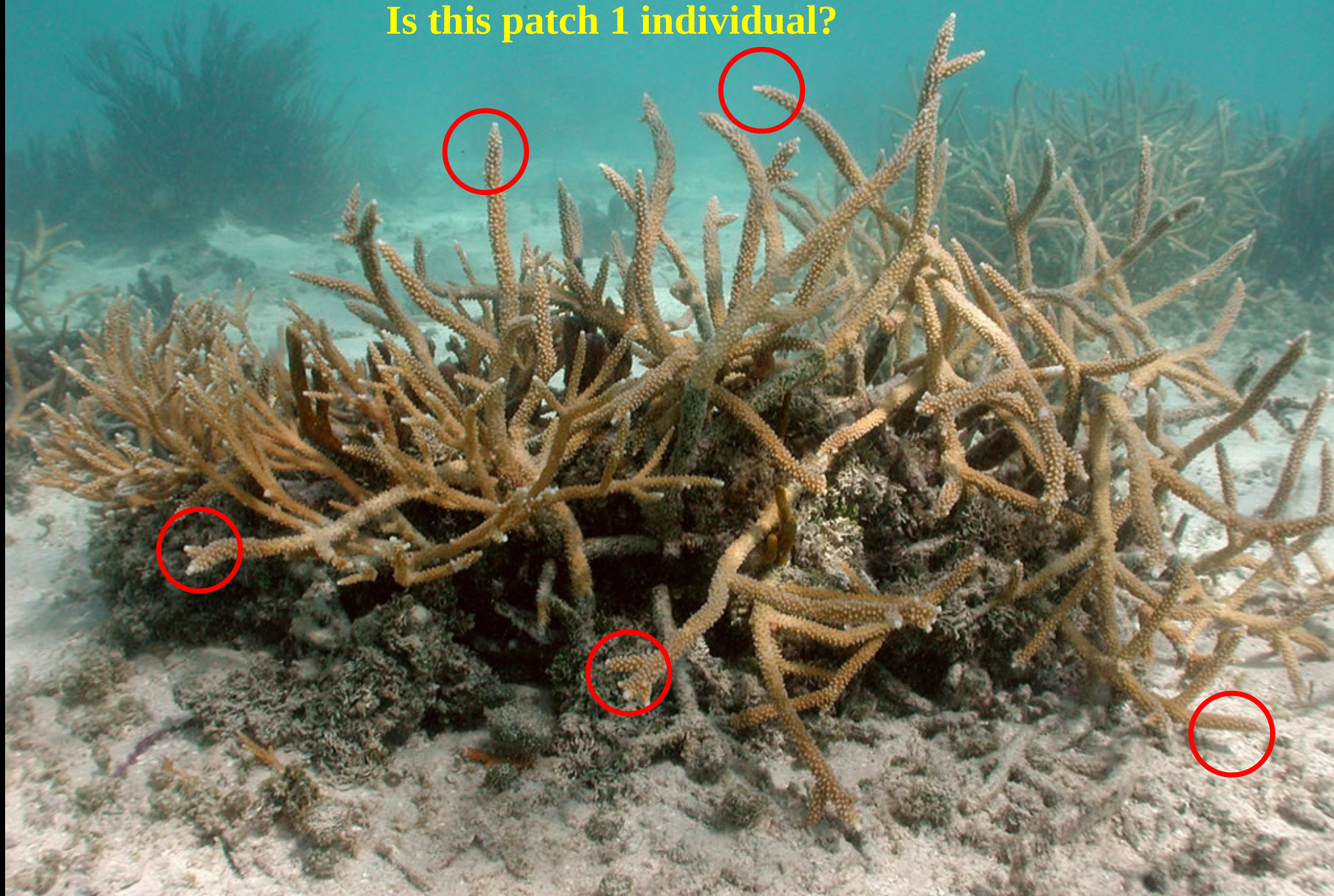
A. palmata

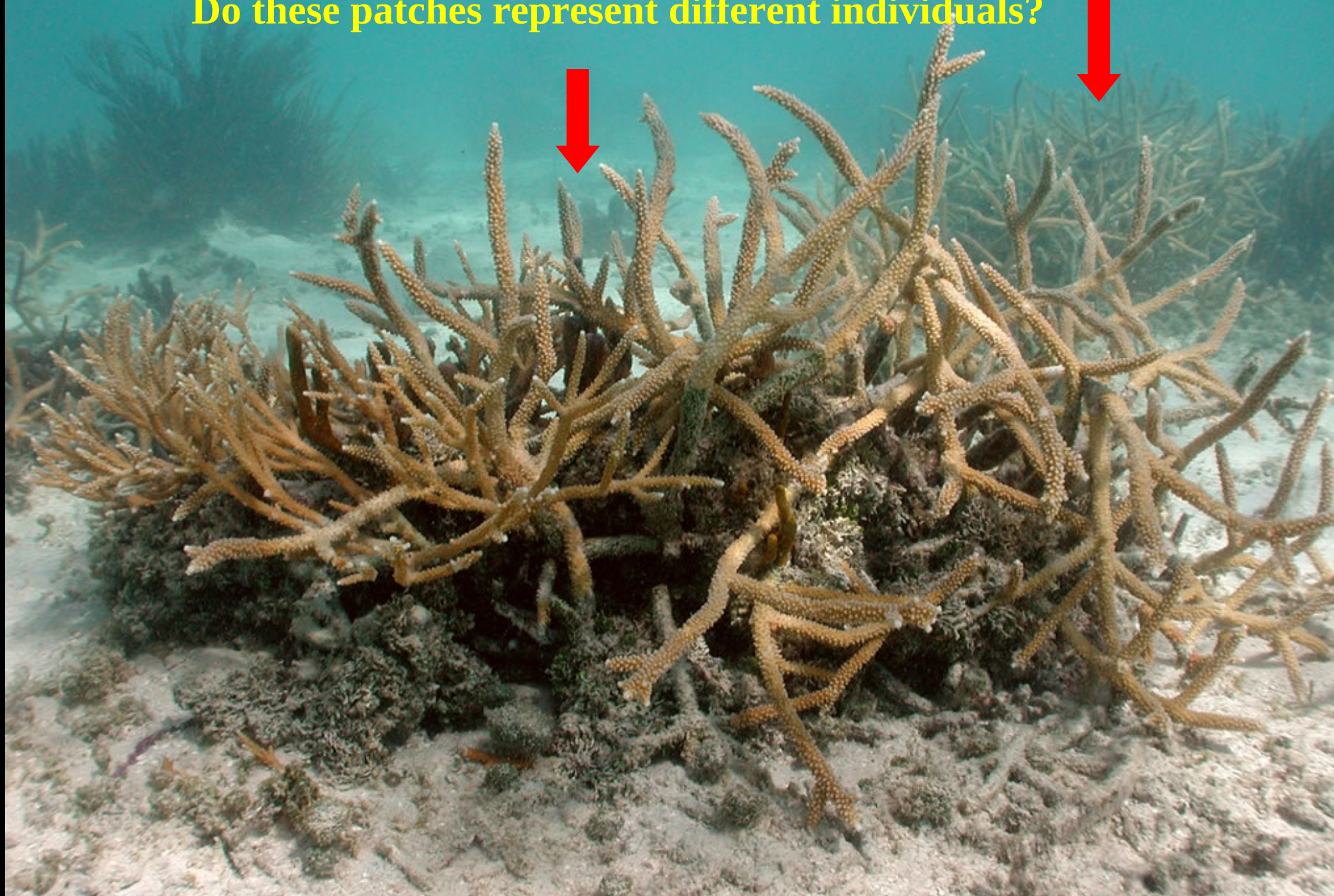
A. cervicornis

Hierarchical Design

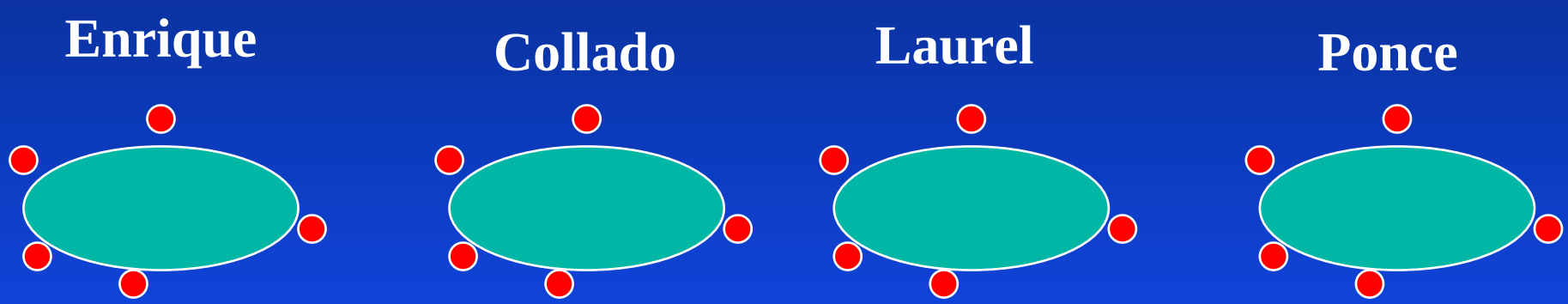
We will evaluate levels of genetic diversity:

1) **Within discrete patches of *Acropora***
2) **Among discrete patches of *Acropora* within sampling locations**
3) **Among sampling locations within islands**
4) **Among different islands**


Is this patch 1 individual?

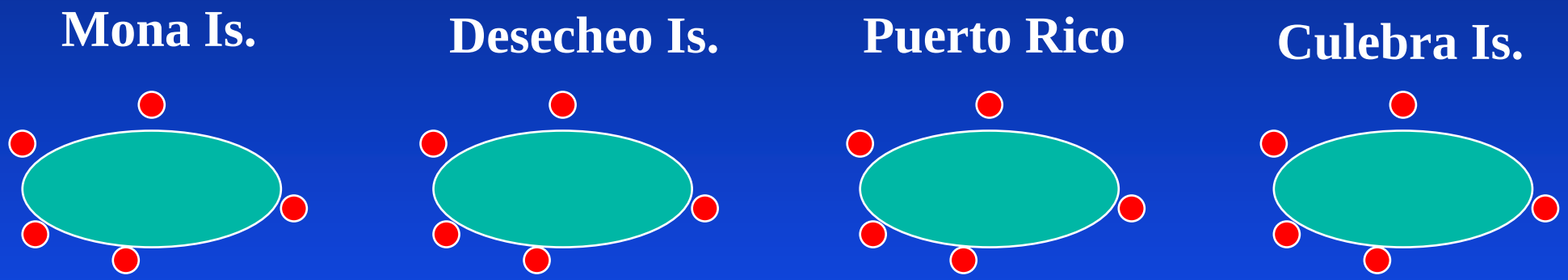

Do these patches represent different individuals?

Genetic diversity of *Acropora* between sampling locations



Acropora patch

Genetic diversity of *Acropora* between islands



Acropora patch

Proposed Sampling Locations of *Acropora*

Sampling Locations

Disturbed: Media Luna, Turrumote, Laurel, Enrique, Margarita, Collado, Guanica, Ponce, Rincon.

Non-disturbed: Desecheo Is., Mona Is., Culebra Is.

Materials and Methods

Candidate Genes:

MtDNA: Cytochrome b, putative control region.

Nuclear DNA: ITS-1, and introns from *Pax-C*, calmodulin, and minicollagen

Course of Action

- **Develop a reliable DNA extraction technique in *Acropora***
- **Optimize PCR amplification conditions for 4-6 genes per specimen**
- **Expand collection of *Acropora* to other locations**
- **Analyze data**

Proposed Schedule

- **January 2005-Summer 2005**
  - **Training of graduate student**
  - **Primer ordering**
  - **Collection of fresh coral tissue (local)**
  - **DNA extraction**
  - **PCR optimization**

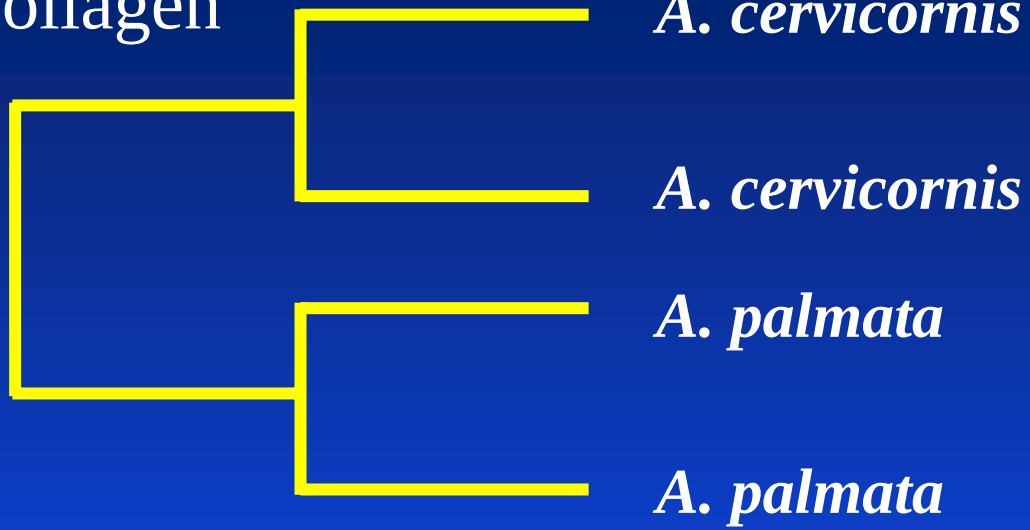
- **Fall 2005-Summer 2006**
  - **Collection of *Acropora* from all locations**
  - **Collection of data**
  - **Data Analysis**
  - **Manuscript Preparation**

People involved with this project

Joselyd Garcia: molecular work, field samples

Sequence divergence in minicollagen, calmodulin, and PaxC (0.6%-2.1%). In ITS-1 is up to 13.2%.

Minicollagen



Calmodulin